Remarks

The Office Action mailed September 20, 2002 has been carefully reviewed and the foregoing amendment has been made in consequence thereof. Submitted herewith, in Appendix A, is a Submission of Marked Up Claims, in accordance with 37 C.F.R. § 1.121.

Claims 1, 3, 4, 7-13, and 16-20 are now pending in this application. Claims 1, 3, 4, 7-13, and 16-20 stand rejected.

The rejection of Claim 1 under 35 U.S.C. §112, first paragraph, is respectfully traversed. Applicants respectfully submit that the subject matter of Claim 1 is clearly set forth in the specification in such a way as to enable one skilled in the art make and use the best mode of the invention as contemplated by the inventors. Claim 1 recites, "... a double insulated rotor and stator *assembly*.." (emphasis added). Claim 1 further recites, "...said double insulated rotor and stator assembly comprising a rotor assembly, wherein the rotor assembly comprises a shaft; a rotor stack coupled to said shaft; and a non-conductive electrically insulating tube disposed on a central portion of said shaft between said shaft and said rotor stack, thereby providing a first layer of electrical insulation." These features are clearly shown in Figure 7, and distinctly described in paragraphs 21 and 39 through 41 of the application. Paragraphs 39 through 41, combined with Figure 7, distinctly describe and show a stator stack 30 and a rotor stack 58, which one of ordinary skill in the art would recognize as a rotor and stator *assembly*, as described in paragraph 21. Additionally, Figure 7 clearly shows dashed lines indicating that rotor stack 58 is to be positioned within stator stack 30, thereby forming a rotor and stator *assembly*. Furthermore, paragraphs 39 through 41, combined with Figure 7, distinctly describe and show a rotor and stator *assembly* including a rotor assembly that includes a shaft 50, a rotor stack 58 coupled to the shaft 50; and a non-conductive electrically insulating tube 54 disposed on the shaft 50

between the shaft 50 and the rotor stack 58, that provides a first layer of electrical insulation.

More specifically, paragraph 21 recites, "Figure 7 is an exploded view of the stator and rotor *assembly* shown in Figure 2." Thus, a rotor and stator *assembly* is clearly described in the specification and shown in Figure 7 in such a way as to reasonably convey to one skilled in the relevant art that the inventors possessed the claimed invention at the time the application was filed.

Still more specifically, paragraph 39 recites in part, "Electronically commutated brushless motor 10 includes two layers of electrical insulation... one layer of insulation comprises insulation tube 54 between shaft 50 and rotor lamination stack 58. Insulation tube 54 is pressed onto shaft 50 and rotor lamination stack 58 is then pressed onto insulation tube 54." Additionally, paragraph 40 recites in part, "Another layer of insulation comprises the plurality of first insulating strips 122 and the plurality of second insulating strips 128. First insulating strips 122 are constructed of an electrically insulating material and fit into stator slots 124 prior to stator windings 126, such that first insulating strips provide a first portion of an electrical barrier between stator windings 126 and stator laminations 30. Second insulating strips 128 are also constructed of an electrically insulating material and are fitted into stator slots 124 after windings 126, such that second insulating strips 128 provide a second portion of an electrical barrier between stator winding 126 and stator laminations 30." Furthermore, paragraph 41 recites in part, "Thus, insulating tube 54 disposed between shaft 50 and rotor stack 58, and the combination of first insulating strips 122 and second insulating strips 128 disposed between stator stack 30 and windings 126, provide a double insulation barrier..." Therefore, a double insulation rotor and stator assembly, as recited in Claim 1, is very clearly described in the specification in such a manner as to reasonably convey to one skilled in the art that the Applicants had possession of the claimed invention at the time the application was filed.

Even further yet, applicants respectfully submit that the language presented in the Office's rejection of Claim 1, in fact lends support to the Applicants position that Claim 1 is definite and particularly points out and distinctly claims the subject matter which the Applicants regard as the invention. It appears that the Office's position is that "a double insulated rotor and stator" in Claim 1 is indefinite. Applicants respectfully submit that Claim 1 should be read as "a double insulated rotor and stator assembly", as is clearly recited in Claim 1. The Office appears to support its position by setting forth four alternative interpretations of "a double insulated rotor and stator assembly". The four alternatives set forth by the Office are: A) a rotor with two insulation layers on a stator with two insulation layer; B) a rotor with one insulation layer, and a stator with two insulation layers; C) a rotor with two insulation layers and a stator with one insulation layer; and D) a rotor with one insulation layer and a stator with one insulation.

Given this line of reasoning, there are mathematically no other alternatives. Thus, if Claim 1 is give the broadest possible interpretation, as pointed out by the Office, "a double insulated rotor and stator assembly" has four definite and distinct alternatives. Also, given the interpretation set fourth by the Office, it appears that the Office, who Applicants consider skilled in the art, understands the specification and Claim 1 to reasonably convey that the inventors possessed four possible alternative embodiments of the invention at the time the application was filed, one of which is the best mode, as described in paragraphs 39-41.

Thus, since the Office appears to interpret "a double insulated rotor and stator assembly" to have four definite alternative interpretations, it is unclear to the Applicants the reasoning behind the Offices position that Claim 1 is indefinite and contains subject matter not described in the specification in such a way as to reasonably convey to one skilled in the art that the Applicants had possession of the claimed invention at the time of filing the application.

For the reasons set forth above, Applicants request that the rejection of Claim 1 under 35 U.S.C. §112, first paragraph, be withdrawn.

The rejection of Claims 1, 3, 7-11 and 16-19 under 35 U.S.C. § 103(a) as being unpatentable over Geschwender et. al. in view of Van Dine et. al. is respectfully traversed.

Geschwender et. al. describes an explosion-proof motor having a metallic, pressure-tight housing that is electrically insulated on the outside with a plastic shell 28. The motor has a rotor 17 and a rotor shaft 9, that is rotatably supported in two bearings 8 and 10. The rotor 17 is surrounded by a stator 26 that is fixedly accommodated in the middle part 1' of the housing.

Van Dine et. al. describes an electric motor shaft 1 that includes a tubular shaft body section 7 formed of composite material and a metallic shaft end fitting 3 affixed at joint 5 to one end of the tubular composite body 7. The tubular composite body is molded of high strength, high modulus fibers such as fiberglass, graphite, carbon, boron quartz and aramyde fiber. An array of ribs 9 for supporting a rotor can be bonded to the shaft using a suitable epoxy or other adhesive.

Claim 1 has been amended in line with previous amendments of which the Office has examined. Therefore, the amendment to Claim 1 does not raise new questions of patentability that require further search and consideration.

As amended, Claim 1 recites, "An electronically commutated brushless motor comprising: a motor housing; a bearing end cap coupled to said motor housing adapted to couple said motor to a motor driven product; and a double insulated rotor and stator assembly annularly fitted in said housing, said double insulated rotor and stator assembly comprising a rotor assembly, wherein said rotor assembly comprises: a shaft configured to deliver torque to said motor driven product; a rotor stack coupled to said

shaft; and a non-conductive electrically insulating tube disposed on a central portion of said shaft between said shaft and said rotor stack, thereby providing a first layer of electrical insulation."

Neither Geschwender et. al., Prindle, nor Van Dine et. al. describe or suggest a double insulated rotor and stator assembly comprising a rotor assembly having a non-conductive electrically insulating tube disposed on a central portion of the shaft between the shaft and a rotor stack, thereby providing a first layer of electrical insulation. Rather, Geschwender el. al. describes an explosion-proof motor having a metallic, pressure-tight housing that is electrically insulated on the outside with a plastic shell. Van Dine et. al. describes a rotor shaft constructed of a composite shaft body having metallic end fittings affixed to and end of the composite body. There is no description or suggestion in Geschwender et. al. or Van Dine et. al. of a rotor assembly that provides a layer of electrical insulation by disposing a non-conductive electrically insulating tube on a central portion of the rotor shaft between the shaft and the rotor stack.

For the reasons set forth above, Claim 1 is submitted to be patentable over Geschwender et. al. in view of Van Dine et. al. Claims 3 and 7-9 depend, either directly or indirectly, from Claim 1. When the recitations of Claims 3 and 7-9 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 3 and 7-9 are likewise patentable over Geschwender et. al. in view of Van Dine et. al.

Claim 10 has been amended in line with previous amendments of which the Office has examined. Therefore, the amendment to Claim 10 does not raise new questions of patentability that require further search and consideration.

As amended, Claim 10 recites, "A method for providing protection against electrical shock when a user comes into contact with accessible metal of a motor driven product coupled to an electronically commutated brushless motor, the motor including a motor housing, a rotor assembly and a stator assembly annularly fitted in the housing,

said method comprising: providing a first layer of insulation in the stator assembly; and providing a second layer of insulation in the rotor assembly, wherein the second layer of insulation includes a non-conductive electrically insulating tube disposed on a central portion of said rotor shaft between said shaft and said rotor stack."

In accordance with the remarks set forth above, in reference to Claim 1, neither Geschwender et. al. nor Van Dine et. al. describe or suggest a method for providing protection against electrical shock, wherein the method comprises providing a first layer of insulation in a stator assembly; and providing a second layer of insulation in a rotor assembly, wherein the second layer of insulation includes a non-conductive electrically insulating tube disposed on a central portion of a rotor shaft between the shaft and a rotor stack.

For the reasons set forth above, Claim 10 is submitted to be patentable over Geschwender et. al. in view of Van Dine et. al. Claims 11 and 16-18 depend, either directly or indirectly, from Claim 10. When the recitations of Claims 11 and 16-18 are considered in combination with the recitations of Claim 10, Applicants submit that Claims 11 and 16-18 are likewise patentable over Geschwender et. al. in view of Prindle and Van Dine et. al.

Claim 19 has been amended in line with previous amendments of which the Office has examined. Therefore, the amendment to Claim 19 does not raise new questions of patentability that require further search and consideration.

As amended, Claim 19 recites, "An electronically commutated brushless motor configured to be coupled to a motor driven product, said motor comprising: a stator stack comprising a stack of steel laminations including a plurality of stator slots; a plurality of windings wound in said stator slots, said windings configured to generate a revolving magnetic field; a first layer of electrical insulation between current carrying components of said motor and accessible metal of said motor, said first layer

comprising a non-conductive electrically insulating material disposed into said stator slots around said windings in said stator slots; a shaft configured to deliver torque to said motor driven product; a rotor stack comprising a stack of steel laminations configured to rotate in said revolving magnetic field and thereby deliver torque to said shaft; and a second layer of electrical insulation between current carrying components of said motor and accessible metal of said motor, said second layer comprising a non-conductive electrically insulating tube disposed on a central portion of said shaft between said shaft and said rotor stack."

In accordance with the remarks set forth above, in reference to Claim 1, neither Geschwender et. al., nor Van Dine et. al. describe or suggest a second layer of electrical insulation between current carrying components of a motor and accessible metal of the motor, wherein the second layer comprises a non-conductive electrically insulating tube disposed on a central portion of a rotor shaft between the shaft and the rotor stack.

For the reasons set forth above, Claim 19 is submitted to be patentable over Geschwender et. al. in view of Van Dine et. al.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1, 3, 7-11, and 16-19 be withdrawn.

The rejection of Claims 4, 12, 13 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Geschwender et. al. in view of Van Dine et. al. and Prindle is respectfully traversed.

Geschwender et. al. and Van Dine et. al. are described above.

Prindle describes an electrical motor having the windings insulated from the stator coils. The stator coils 10 are insulated from the stator 3 by disposing an insulating material 11 between the stator 3 and the stator coils 10. The exciter coils 12

are insulated from the stator coils 10 by insulating material 13 interposed therebetween. To insulate the exposed surfaces of the exciter coils 12 there is provided insulation 14.

Claim 4 depends indirectly from Claim 1. The recitations of amended Claim 1 are shown above. Neither Geschwender et. al., Prindle, nor Van Dine et. al. describe or suggest a double insulated rotor and stator assembly comprising a rotor assembly having a non-conductive electrically insulating tube disposed on a central portion of a shaft between the shaft and a rotor stack, thereby providing a first layer of electrical insulation. Rather, Geschwender el. al. describes an explosion-proof motor having a metallic, pressure-tight housing that is electrically insulated on the outside with a plastic shell, and Prindle describes an electrical motor having the stator coils insulated from the stator. Van Dine et. al. describes a rotor shaft constructed of a composite shaft body having metallic end fittings affixed to the composite body. There is no description or suggestion in Geschwender et. al., Prindle or Van Dine et. al. of a rotor assembly that provides a layer of electrical insulation by disposing a non-conductive electrically insulating tube on a central portion of the rotor shaft between the shaft and the rotor stack.

For the reasons set forth above, Claim 1 is submitted to be patentable over Geschwender et. al. in view of Prindle and Van Dine et. al. Since Claim 4 depends from Claim 1, when the recitations of Claim 4 are considered in combination with the recitations of Claim 1, Applicants submit that Claim 4 is likewise patentable over Geschwender et. al. in view of Prindle and Van Dine et. al.

Claims 12 and 13 depend indirectly from Claim 10. The recitation of amended Claim 10 are shown above.

In accordance with the remarks set forth above, in reference to Claim 1, neither Geschwender et. al., Prindle nor Van Dine et. al. describe or suggest a method for providing protection against electrical shock, wherein the method comprises providing a

first layer of insulation in a stator assembly; and providing a second layer of insulation in a rotor assembly, wherein the second layer of insulation includes a non-conductive electrically insulating tube disposed on a central portion of a rotor shaft between the shaft and a rotor stack.

For the reasons set forth above, Claim 10 is submitted to be patentable over Geschwender et. al. in view of Prindle and Van Dine et. al. Since Claims 12 and 13 depend from Claim 10, when the recitations of Claims 12 and 13 are considered in combination with the recitations of Claim 10, Applicants submit that Claims 12 and 13 are likewise patentable over Geschwender et. al. in view of Prindle and Van Dine et. al.

Claim 20 depends directly from Claim 19. The recitations of amended Claim 19 are shown above.

In accordance with the remarks set forth above, in reference to Claim 1, neither Geschwender et. al., Prindle nor Van Dine et. al. describe or suggest a method for providing protection against electrical shock, wherein the method comprises providing a first layer of insulation in a stator assembly; and providing a second layer of insulation in a rotor assembly, wherein the second layer of insulation includes a non-conductive electrically insulating tube disposed on a central portion of a rotor shaft between the shaft and a rotor stack.

For the reasons set forth above, Claim 19 is submitted to be patentable over Geschwender et. al. in view of Prindle and Van Dine et. al. Since Claim 20 depends from Claim 19, when the recitations of Claim 20 are considered in combination with the recitations of Claim 19, Applicants submit that Claim 20 is likewise patentable over Geschwender et. al. in view of Prindle and Van Dine et. al.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 4, 12, 13, and 20 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now pending in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

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